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nitrifying agents, are considered responsible for the lack of progressive improvement of soil conditions and the persistence of xerophytes. The same factors account for the relative absence of herbaceous plants. In seeking for the origin of this flora, after an examination of the available evidence, Miss GIBBS concludes that the mountains of New Guinea may be considered as the focus of development and distribution of the so-called "antarctic" plants, justifying the term Papuan austral-montane for this group, of which, even on the limited basis of our present knowledge, nearly one-half of its most characteristic genera are now known from New Guinea. The author also contends that the north-westerly poleward wind which sweeps persistently over the mountains of New Guinea above tree level, in a constant direction and at a constant altitude, decreasing in height in its progress southward, is the agency by which this flora has been transported. Once established, the elements remain within the radius of the lower but equally constant circumpolar wind.

Collections from these montane associations show 108 species of vascular plants, of which 67 are endemic, the most remarkable family being the Coniferae with 7 genera and 9 species, 3 genera and 8 species being endemic. Other large families are the Proteaceae with 8 species, all endemic, the Myrtaceae with 5 species, 3 being endemic, the Epacridaceae with 20 species, of which 16 are endemic, and the Compositae with 19 species, 12 being endemic. Among families well represented in boreal montane regions, but much less conspicuous in Tasmania, are the Cyperaceae, Ranunculaceae, Cruciferae, Rosaceae, and Ericaceae, each represented by only a single species.—GEO. D. FULLER.

**Aluminum and soil acidity.**—MIRASOL<sup>7</sup> has done a piece of work on the relation of aluminum to soil acidity, working on three different acid silt loams from southern Illinois. "In the absence of some calcium compounds as a source of calcium, aluminum salts were highly toxic to sweet clover when applied in amounts chemically equivalent to five times the acidity of the soil. In the presence of calcium silicate, aluminum nitrate was more toxic than aluminum sulphate. . . . Aluminum mono-hydroxide did not have any effect on sweet clover when other plant food elements were added in the soluble form. Calcium carbonate in sufficient amount corrected the toxicity of aluminum salts, by precipitating aluminum as calcium aluminate, an insoluble compound. Acid phosphate applied at the rate of 400 pounds per acre reduced the toxicity of aluminum salts by forming aluminum phosphate, an insoluble compound." Like HARTWELL and PEMBER, in an article recently reviewed in this journal, MIRASOL found that acid phosphate precipitates soluble aluminum, but in contrast to these investigators he found that acid phosphate decreases the acidity rather than increases it as they had assumed. "The form of aluminum immediately concerned in the unproductivity of acid soils in the soluble form is the salts. . . . In soils sufficiently provided with calcium,

<sup>7</sup> MIRASOL, J. J., Aluminum as a factor in soil fertility. *Soil Science* 10:153-193. 1920.

toxic aluminum salts may never be found, but in soils deficient in calcium and other bases, as in acid soils, toxic aluminum salts are largely the end products of sulphofication and nitrification. It is not denied that iron and manganese may become contributing factors in the unproductivity of some acid soils, but the preponderance of evidence points to aluminum as the determining factor in the acidity of the soils under investigation."—WM. CROCKER.

**Soluble substances in soils.**—McCOOL and MILLAR<sup>8</sup> have studied the rate at which substances become soluble in soils of various origins, types, ages, etc. The solubility was determined by the Bouyoucos freezing point method. The soils were leached free from soluble materials and then allowed to stand in water for various periods (5, 10, 30, and 60 days), and the freezing points determined at the ends of these periods. Contrary to the common view, soils from regions of lower precipitations are not more soluble than those from higher precipitations. The so-called new soils are less active than those somewhat older, and aged soils are almost inert. Subsoils liberate soluble salts very slowly, there being little activity below 6 inches. Sand particles are very inactive, and silts and clays are mainly responsible for the soluble materials. Grinding increases solubility. When soils were treated with 0.1N  $\text{NaNO}_3$  and then washed free of soluble materials, the rate of dissolving was measurably affected. Western soils responded somewhat more readily than others. The Michigan Agricultural Experiment Station is studying this problem from several angles (composition of the soil, solutions on cropped and uncropped soils, residuary effects of salts on soils of different texture) and the work promises to be a valuable contribution to our knowledge of soil fertility. —WM. CROCKER.

**Dormancy in trees.**—COVILLE<sup>9</sup> has emphasized the significance of cold in forcing trees out of their autumn dormancy. He finds temperatures of 32–40° F. the most effective, and emphasizes the transformation of starches to sugars as an important result of the low temperature. The effective temperatures agree well with those found for the after-ripening of dormant embryos in this laboratory.—WM. CROCKER.

**Living stumps.**—The continued growth of stumps and the healing over of the cut surface is not uncommon in the case of *Pseudotsuga*. PEMBERTON,<sup>10</sup> investigating the phenomenon on Vancouver Island, British Columbia, finds the continued growth of the stumps due to the transference of food from living trees connected with stumps by means of subterranean root grafts. Instances are cited when growth ceased immediately with the cutting of the host tree.—GEO. D. FULLER.

<sup>8</sup> McCOOL, M. M., and MILLAR, C. E., The formation of soluble substances in soils taken from widely separated regions. *Soil Science* 10:219–235. 1920.

<sup>9</sup> COVILLE, F. V., The influence of cold in stimulating the growth of plants. *Nat. Acad. Sci.* 6:434–435. 1920.

<sup>10</sup> PEMBERTON, C. C., Living stumps of trees. *Amer. Forestry* 26:614–616. figs. 6. 1920.